



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/582,818

01/25/2007

Adrian James Cable

3808.1003-000

8692

21005

7590

06/22/2010

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

530 VIRGINIA ROAD

P.O. BOX 9133

CONCORD, MA 01742-9133

EXAMINER

CHWASZ, JADE R

ART UNIT

PAPER NUMBER

2872

MAIL DATE

DELIVERY MODE

06/22/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/582,818

Applicant(s)

CABLE ET AL.

Examiner

Jade R. Chwasz

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 May 2010.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
4a) Of the above claim(s) 11-17 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-10 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 14 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/GS/US)
4) ☐ Interview Summary (PTO-413)
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____
Paper No(s)/Mail Date _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/24/10 has been entered.

Response to Amendment

2. The amendments to the claims, in the submission dated 5/24/10, are acknowledged and accepted.

Response to Arguments

3. Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

4. Claim 2 is objected to because it recites the limitation "the repeating pattern of holographic elements" in line 5. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 9 is rejected under 35 U.S.C. 102(b) as being anticipated by Ori (6,023,353).

Consider claim 9, Ori discloses (e.g. figures 3 and 5) a holographic display comprising a spatial light modulator (2A, spatial phase modulation element) to provide a pixellated hologram display device having a predetermined resolution and a pixellated phase mask (17/18, phase-modulated hologram surfaces), the SLM displaying holograms that are viewed through the phase mask e.g. hologram surface of the bottom portion of the device), wherein the phase mask being arranged so that the respective location where its pixels meet are disposed above (i.e. the phase mask is arranged to be optically aligned with respect to the SLM device) generally central regions of the pixels of the display device (2A, spatial phase modulation element) [col. 4, lines 45-57, col. 6, lines 32-67].

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ori (6,023,353) in view of Kasazumi et al. (EP 0450644 A2) of record.

Consider claims 1-2, Ori discloses (e.g. figures 3 and 5) a holographic display comprising a spatial light modulator (2A, spatial phase modulation element) to provide a pixellated hologram display device having a predetermined resolution and a pixellated phase mask (17/18, phase-modulated hologram surfaces), the SLM (e.g. top portion of the device) displaying holograms that are viewed through the phase mask (e.g. hologram surface of the bottom portion of the device) [col. 4, lines 45-57, col. 6, lines 32-67].

However, Ori does not disclose that the phase mask cooperates with the SLM such that the repeating pattern of holographic elements has a higher resolution than the predetermined resolution. Ori and Kasazumi et al. are related as light modulating devices. Kasazumi et al. disclose (e.g. figures 3a-3c) a holographic display comprising a spatial light modulator (300, liquid crystal device) and a pixellated hologram display device having a predetermined resolution and a pixellated phase mask (200, diffuser), wherein the phase mask co-operates with the SLM such that a repeating pattern of holographic elements (the phase mask imparts a repeating phase shift pattern of $\pi/2$ onto the SLM device) has a higher resolution than the predetermined resolution (there are 9 pixels in the phase mask for every one pixel on the SLM device) [pg. 5, lines 3-35]. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Ori, as taught by Kasazumi et al., in order to obtain an image of high quality through the holographic display system.

Consider claim 3, the modified Ori reference discloses (e.g. figures 3a-3c of Kasazumi et al.) a holographic display wherein the pixellated hologram display device is

arranged to display binary phase holograms and the phase mask has four phase levels (e.g. 0, $\pi/2$, π , $3\pi/2$) [pg. 5, lines 18-55 of Kasazumi et al.].

Consider claim 4, the modified Ori reference discloses (e.g. figures 3a-3c of Kasazumi et al.) a holographic display device wherein the display is constructed and arranged to operate at a given optical wavelength (wavelength at which the device operates), and taking one of the phase levels as a reference (e.g. the zero phase level), the others provide respective phase shifts of $\pi/2$, π , $3\pi/2$ at the given wavelength [pg. 5, lines 18-26 of Kasazumi et al.].

Consider claim 5, the modified Ori reference discloses (e.g. figures 3a-3c of Kasazumi et al.) a holographic display device wherein the hologram display device is arranged to display four phase holograms (e.g. 0, $\pi/2$, π , $3\pi/2$) and the phase mask has two phase-levels (at least two phase-levels are disclosed) [pg. 5, lines 18-55 of Kasazumi et al.].

Consider claim 6, the modified Ori reference discloses (e.g. figures 3 and 5 of Ori) a holographic display device wherein the SLM is a liquid crystal SLM (2A, spatial phase modulation element) [col. 6, lines 32-67 of Ori].

Consider claims 7 and 8, Ori discloses (e.g. figures 3 and 5) a method of increasing the viewing angle of a hologram on a pixellated hologram display device having a predetermined resolution, the method comprising: disposing a pixellated phase mask (17/18, phase-modulated hologram surfaces) with respect to the pixellated hologram display device (2A, spatial phase modulation element), the holograms being

viewed through the phase mask (e.g. hologram surface of the bottom portion of the device) [col. 4, lines 45-57, col. 6, lines 32-67].

However, Ori does not disclose that the phase mask has a higher resolution than the predetermined resolution. Ori and Kasazumi et al. are related as light modulating devices. Kasazumi et al. disclose (e.g. figures 3a-3c) a holographic display comprising a spatial light modulator (300, liquid crystal device) and a pixellated hologram display device having a predetermined resolution and a pixellated phase mask (200, diffuser), that has a higher resolution than the predetermined resolution (there are 9 pixels in the phase mask for every one pixel on the SLM device) [pg. 5, lines 3-35]. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Ori, as taught by Kasazumi et al., in order to obtain an image of high quality through the holographic display system.

Consider claim 10, the modified Ori reference discloses (e.g. figures 3 and 5 of Ori) a holographic display device configured to calculate holograms for display on the SLM (2A, spatial phase modulation element) by a method (e.g. rapid calculation of holograms for a scene) in which noise in the replay image is reduced (e.g. the phase pattern is optimized) by displaying a plurality of holograms per image frame (e.g. via the 32x32 pixel sub-cell formation of the phase hologram) [col. 7, lines 4-67 of Ori]. Although Ori does not explicitly disclose that the method is a one step phase retrieval method, it would have been obvious to a person of ordinary skill in the art at the time the invention was made that such a method could be used, since a phase retrieval method is disclosed and there are a finite potential ways in which the calculations can be

processed. A person with ordinary skill in the art has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product is not of innovation but of ordinary skill and common sense; see **Pfizer, Inc. v. Apotex, Inc. (480 F.3d 1348, 82 USPQ2d 1321 (Fed. Cir. 2007))**. Further a person of ordinary skill in the art would have been motivated to modify the calculation method of Ori, so that processing time can be reduced without compromising the overall image quality of the display device.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jade R. Chwasz whose telephone number is (571)272-8199. The examiner can normally be reached on Monday to Friday 6:00 am -3:30 pm est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephon B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JRC
/Jade R. Chwasz/
Examiner, Art Unit 2872

/Stephone B. Allen/
Supervisory Patent Examiner
Art Unit 2872